

How Much is a Life Worth? Examining the Risk-Wages Trade Off in Pakistan

Governments across the world use estimates of people's willingness to pay for a reduction in the probability of death and injury to develop a wide range of environmental, industrial and developmental policies. Economists call the trade-off that people are willing to make between money and fatality risks the Value of a Statistical Life (VSL). This Brief reports on a study by Muhammad Rafiq from the Institute of Management Sciences, Peshawar, which estimates, for the first time, the VSL for workers in Pakistan.

Rafiq estimates that the VSL in Pakistan ranges from PKR 28 million (USD 321,813) to PKR 67 million (USD 775,193). These estimates are consistent with values obtained from studies undertaken in other developing countries. The estimated VSL values can be used for cost-benefit analyses (CBA) of a range of projects, including pollution control; or they could be used by insurance companies for settling claims. Moreover, they could also be used by policy makers to assess the true impact of the war on terror in Pakistan.

Multiple Methods and Few Numbers

VSL is generally estimated using one of three main approaches. The first uses the differences in wages that workers must be paid to take riskier jobs. The second examines other behaviors where people weigh costs against risks. The third approach uses contingent valuation surveys where respondents report their willingness to pay (WTP) to obtain a specified reduction in mortality risks.

Most VSL studies have been conducted in developed countries and no such studies have been done in Pakistan. However, a recent World Bank publication (that estimated the annual health effect of ambient air pollution in Pakistan) suggests an implied VSL for the country of approximately three million PKR per statistical life. This estimate, made by extrapolating information from other countries, is lower than estimates obtained in other regional and international studies. It is also significantly lower than the estimates in this Policy Brief. Thus, the absence of estimates of VSL in Pakistan can pose a serious problem

for policy makers when it comes to assessing the costs and benefits of different policy options.

Estimating VSL in Lahore

The study assesses the VSL in Pakistan by looking at the relationship between wages and job-related risks in Lahore. Lahore is the capital of Punjab Province. It is also the second-biggest city and the financial center of Pakistan and has a large industrial area. Lahore makes a good location for this study as the city faces a number of serious health and safety challenges.

A survey conducted by the Centre for the Improvement of the Working Conditions and Environment (CIWCE) based in Lahore found that many of the industries in the city do not provide basic health and hygiene amenities and that many factories have poor exhaust filters, fire deterrence measures, health facilities (including basic amenities such as first-aid boxes), emergency transport and waste disposal mechanisms. In many instances, the city's factories do not even display hazard-warning signs. Moreover, the use of new chemicals in the city's industrial plants has led to an increase in accidents.

How Workers Balance Risk and Wages

Studies have shown that workers, when making decisions regarding a job, factor in both the financial and non-financial characteristics of the work. These characteristics include wages, working hours, career paths, the hardship of the work, pensions and benefits and any risk to life and health. Nonetheless job safety is one of the most important things that people take into account when deciding on whether to take a job.

According to the theory of compensating wage differentials, if workers know that one job is riskier than others, then they will expect some form of extra compensation. It was Adam Smith who first proposed this theory when he stated, “the wages of laborers vary with the ease or hardship, the cleanliness or dirtiness, the honorableness or dishonorableness of the employment”. Since then a number of researchers have refined and reorganized this concept by developing statistical models to unravel the tradeoffs that people make between wages and risks from other factors that affect wages. This approach, called the Hedonic (quality adjusted) Wage Model, tries to determine the variation in wages that are caused by a range of different factors, including job-related fatal and non-fatal risks. The model also looks into employees’ demands for more protection and the incremental costs that firms must shoulder to provide that protection.

According to the Hedonic Wage Model, the demand for labor is a decreasing function of the cost of employing laborers. This cost includes wages, compensation, training and development, rest days and the provision of safety measures. Firms are willing to pay less to their workers as the cost of ensuring their safety for a given level of profit increases. The supply of labor is therefore influenced by wage and risk preferences. Workers are assumed to choose a wage-risk combination in the market offering the highest wages and wages are assumed to increase with any increase in the degree of risk. Consequently, workers balance the risk they face in a job with benefits they will get from the income for that job. For this choice to happen in a meaningful way, workers need to be knowledgeable about their potential working environments when they choose their jobs.



Looking at the Risks Faced by Blue-collar Workers

The study focused on blue-collar male workers in the manufacturing sector. These workers were chosen because, according to recent information, they are the victims of the highest number of fatal and non-fatal accidents. The study was limited to those workers who were 18 years or above and who had been in their jobs for at least one year. This was done so that only workers who were familiar with the local job market and who were aware of the job-related risks were included. The obvious limitation of restricting the representative sample to formal-sector manufacturing workers in Lahore is that it leaves out the informal sector.

Information for the study was collected using interviews with the industrial workers. An initial pilot survey was carried out, during which difficulties were encountered because factory owners were reluctant to allow their workforce to be questioned. In the end, three different approaches were used to establish contact with workers: i) contacting the employers, ii) visiting cafeterias inside industrial zones during lunch or tea time, and iii) going to residential compounds and villages during rest days. The survey was conducted in all parts of Lahore including its industrial zones, housing colonies and the villages on its periphery. 680 respondents were interviewed.

Information on take-home hourly wages was gathered from respondents. Hourly wages were recorded as most of the respondents were casual workers who worked for a daily wage and therefore could not be sure of continuous employment. To make an annualized assessment of their wages, their hourly wages were multiplied by a standard 2,000 annual hours of work.

Assessing Risks

The most important, but challenging, part of the study involved obtaining variables representing fatality and injury risks. Two approaches were used. The first involved collecting industry-level data relating to accident rates. The data relating to fatal accidents was compiled from the records of the Punjab Employees Social Security Institute. Records were obtained manually by looking into registers in main and sub-offices across different parts of Lahore. This information reflected real risk, however, it varied only across industries, making it difficult to clearly identify the impact of the risk on wages.

The second approach involved collecting worker-level data on perceived risks. Respondents were asked for their assessment of risk for both deaths and injuries. Risk was measured in three ways: using a 5-point Likert scale for fatality, a 5-point Likert scale for injury, and a 0-10 scale to assess the probability of receiving a fatal risk. This data was gathered through a survey. Using this information it was possible to identify the impact of the risk on wages. However, since the data gives a measure of perceived and not actual risk, it may have suffered from measurement errors.

The Value of Statistical Life in Pakistan

Of the workers interviewed, approximately 81.5 percent thought their risk of being killed as a result of their job was minimal, while 13 percent of the workers thought it was below average. Approximately 2 percent considered the risk to be average and above average. Only 1 percent perceived their jobs to be high risk as compared to any other job they could do.

The industry-level fatality rate and the perceived fatality rate were similar and stood at 1.17 and 1.36 per 10,000 per annum respectively. The industry-level injury averages for both Pakistan as a whole and for Punjab alone were also very close at 4.14 and 3.9 per 100 workers per year respectively. The study found

that, overall, a higher fatality risk was associated with higher wages. With respect to the injury risk, the results were less clear cut.

From these figures the Value of Statistical Life (VSL) in Pakistan was calculated. It ranged from PKR 28 million (USD 321,813) to PKR 67 million (USD 775,193). The variation in the results has to do with the use of different risk measures (actual and perceived risk) in the calculations. These values are smaller than the VSLs of other developed countries that lie between USD 4 million to 9 million. However, the results are comparable with the VSL estimates for many other developing and middle-income countries, including Mexico, India, South Korea, and Hong Kong.

Workers in Pakistan Take Risk into Account

The study concludes that a compensating wage differential does exist in the formal private sector in Pakistan, i.e. workers ask for higher wages for riskier jobs. It also shows that the market does compensate

Comparative Statistics of VSL in Developing Countries

Study	Country	Average Income (USD 2000)	Average Fatal Risk (per 10,000)	VSL (USD 2000)
Hammitt and Ibarraran	Mexico	4,100	3.0	230,000-310,000
Kim and Fishback (1999)	South Korea	8,100	4.9	800,000
Liu et al. (1997)	Taiwan	5,000-6,100	2.3-3.8	200,000-900,000
Liu et. al.	Taiwan	18,500	5.1	700,000
Shanmugam (1997)	India	780	1.0	1,200,000-1,500,000
Shanmugam (2000)	India	780	1.0	1,000,000-1,400,000
Shanmugam (2001)	India	780	1.0	4,100,000
Madheshwaran (2004)	India	780	1.13	305,000-318,000
Siebert and Wei	Hong Kong	11,700	1.4	1,700,000
Rafiq (2011)	Pakistan	670	1.17,-1.36*	321,813- 775,193

Source: partly developed from Hammitt and Ibarraran (2006).

Madheshwaran (2004) and Rafiq (2011) VSL numbers are not converted to 2000 USD.

*refers to perceived risk

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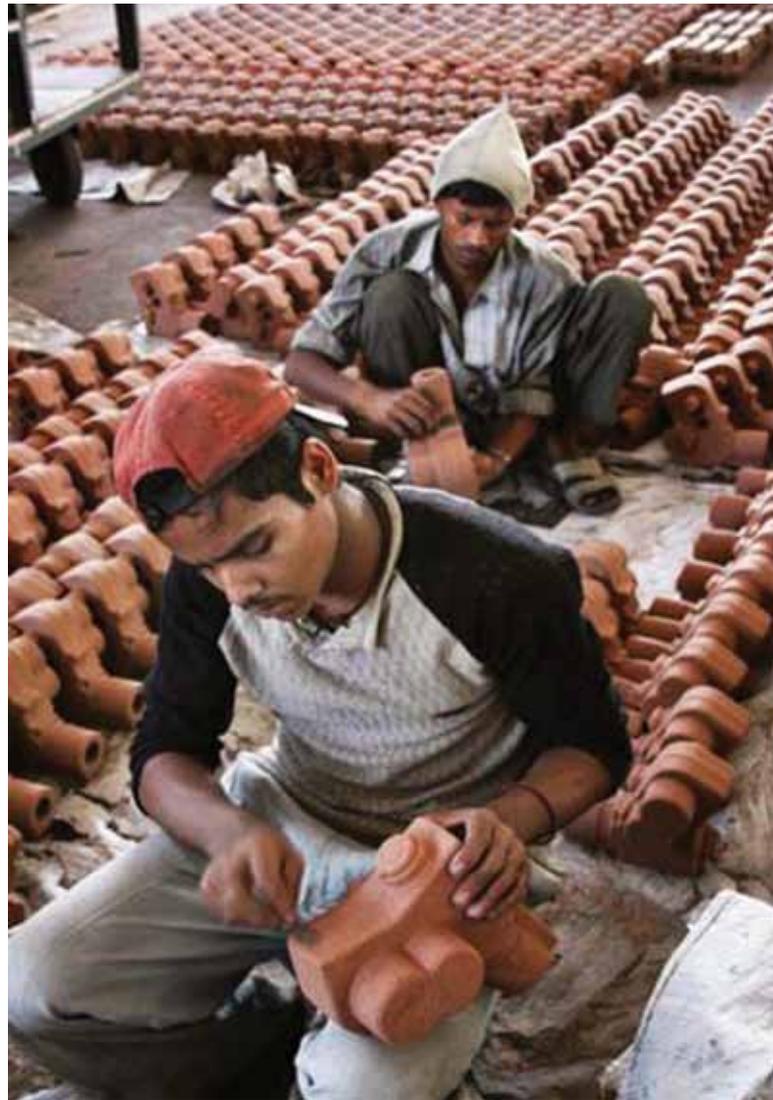
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workers for taking risks. The study also highlights the fact that industrial workers in the formal sector in Pakistan are rational, in that they factor in risk when accepting a job.

As mentioned, the study's findings could be used for cost-benefit analyses for a variety of projects, including pollution control initiatives. Given the present 'war on terror' in Pakistan, the results can also be utilized to assess the true cost of this war. They could also be used by insurance companies for settling claims. However, as the study is the first of its type to be attempted in Pakistan, it has a number of limitations. In this study, risks have been treated as exogenous whereas they can be endogenous. Moreover, the values reported are not age-specific. Further research in this area could overcome these shortcomings and is recommended.

This policy brief is an output of a research project funded by SANDEE. The views expressed here are not necessarily those of SANDEE's sponsors.

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